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(71) Applicant (*for all designated States except US*): **SOCI-  
ETE DES PRODUITS NESTLE S.A.** [CH/CH]; P.O. Box  
353, CH-1800 Vevey (CH).

(72) Inventors; and

(75) Inventors/Applicants (*for US only*): **BELL, David, Alan**  
[GB/GB]; 71 Eastfield Avenue, Haxby, York YO32 3EZ  
(GB). **PICKFORD, Emma** [GB/GB]; Flat 2, 9 Wenlock  
Terrace, Fulford, York YO10 4DU (GB).

(74) Agent: **PATE, George, Frederick**; 55, avenue Nestlé,  
CH-1800 Vevey (CH).

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(54) Title: CONFECTIONERY PRODUCT CONTAINING ACTIVE INGREDIENTS

(57) Abstract: A confectionery product, e.g. chocolate containing one or more active ingredients characterised in that the active ingredients are incorporated in a plurality of carrier bodies dispersed within the body of the confectionery product.



**WO 02/00033 A1**

## CONFECTIONERY PRODUCTS CONTAINING ACTIVE INGREDIENTS

## FIELD OF THE INVENTION

5 The present invention relates to confectionery products containing active nutritive/functional ingredients, also known as dietary supplements.

## BACKGROUND OF THE INVENTION

10

Active nutritive or functional ingredients, which will hereinafter be referred to as "active ingredients", include substances which are part of the daily diet such as vitamins and minerals, dietary supplements and  
15 herbal products which are considered to be beneficial to the health and may also give a feeling of well-being.

Chocolate confectionery products are known which  
20 contain active nutritive ingredients dispersed in minute particulate form or as dissolved solids throughout the product and are therefore invisible to the consumer and thus confer the element of functionality. It would be desirable if the active  
25 ingredients could be presented in the chocolate confectionery product in a form where their presence is obvious to the consumer both visibly and on eating the product. It is however undesirable to incorporate active ingredients in larger particulate form or in  
30 liquid form because larger particles can have an adverse effect on the texture or taste of the confectionery product. Also, often functional ingredients are only required in very small quantities. Some active ingredients are water-soluble and may not  
35 be compatible with chocolate.

We have found that if these active ingredients are dispersed throughout a confectionery product in one or a plurality of carrier bodies, the incorporation of the active ingredient could be facilitated because it could be incorporated in much larger and visible particulate form or in liquid form. In addition, the carrier bodies could be made visible to the consumer on eating the confectionery product and may conveniently be of any desired shape, e.g. cubes, spheres, rectangles, triangles, polygons, stars, leaves, or irregular, random shape. They may also be in the form of strands running through the product or layers. The carrier bodies are preferably visually and/or texturally distinct from the surrounding confectionery product. Moreover, when the confectionery product contains more than one active ingredient, the formulation of the carrier bodies may, if necessary, be adjusted to enable one active ingredient to be released quickly and another active ingredient to be released slowly. An additional advantage of concentrating functional ingredients into one or more discrete components of the product minimises production plant contamination.

#### SUMMARY OF THE INVENTION

According to the present invention there is provided a confectionery product comprising a basic confectionery component containing one or more active ingredients characterised in that the active ingredients are incorporated in a plurality of carrier bodies dispersed within the body of the confectionery product.

#### DETAILED DESCRIPTION OF THE INVENTION

The basic confectionery component may be any confectionery material and may contain one or more

additional confectionery materials different to the basic confectionery component.

Examples of confectionery material include chocolate,  
5 biscuit, wafer, nougat, praline, nuts, fruit, jelly,  
fondant cream, paste, caramel, chews, chewing gum, etc.  
For example, if the basic confectionery component is  
chocolate, it may contain additionally one or more  
additional confectionery materials different to  
10 chocolate, e.g. biscuit, wafer, nougat, praline, nuts,  
fruit, jelly, fondant cream, paste, caramel, etc.

When the basic confectionery component contains  
additional confectionery materials, these confectionery  
15 materials may be arranged in any number of  
dispositions, e.g. layers, clusters, etc.

When the basic confectionery component is chocolate,  
the chocolate may be, for instance, dark, milk or white  
20 chocolate or it may be a fat containing confectionery  
material including chocolate substitutes and fat  
containing direct cocoa butter replacements, stearines,  
coconut oil, palm oil, butter or any mixture thereof;  
nut pastes such as peanut butter; praline;  
25 confectioner's coatings also known as compound or  
couvertures, used for covering ice cream or cakes  
usually comprising chocolate analogues with cocoa  
butter replaced by a cheaper non-tempering fat; or  
"Caramac" sold by Nestlé comprising non-cocoa butter  
30 fats, sugar and milk.

The active ingredient may be any vitamin, enzyme,  
amino-acid supplement, protein, gum, carbohydrate,  
phytochemical, dextrose, lecithin, other trace  
35 nutrient, brain-stimulating substance, energy provider,  
a mineral, mineral salt, botanical extract,

antioxidant, prebiotic, probiotic bacteria, fatty acid, oat beta glucan or other functional fibre, creatine, carnitine, bicarbonate, citrate, or any mixture thereof.

5

The mineral may be calcium, iron, selenium, zinc, magnesium, phosphorus, iodine, manganese, iron, boron or copper, molybdenum, potassium, chromium, vanadium or fluoride.

10

The phytochemical may be a polyphenol, procyanidin or a phenolic acid, catechin or epicatechin, isoflavone, terpene or other phytonutritive plant material.

15

The botanical extract may be selected from Guarana, Ginkgo Biloba, Kola nut, Goldenseal, Golo Kola, Schizandra, Elderberry, St. John's Wort, Valerian and Ephedra, beta-sitosterol, caffeine, cafestol, D-limonene, kabweol, nomilin, oltipraz, sulphoraphane, tangeretin, black tea, white tea, java tea, folic acid, garlic oil, fiber, green tea extract, lemon oil, mace, licorice, menthol, onion oil, orange oil, rosemary extract, milk thistle extract, Echinacea, Siberian ginseng or Panax ginseng, lemon balm, Kava Kava, matte, bilberry, soy, grapefruit, seaweed, hawthorn, lime blossom, sage, clove, basil, curcumin, taurine, wild oat herb, dandelion, gentian, aloe vera, hops, cinnamon, peppermint, grape, chamomile, fennel, marshmallow, ginger, slippery elm, cardamon, coriander, anise, thyme, rehmannia, eucalyptus, menthol, kava kava, schisandra, withania, cowslip, lycium, passion flower.

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The antioxidant substance may be glutathione peroxidase, superoxide dismutase, catalase, co-enzyme Q10 or honey.

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The prebiotic may contain fructose, galactose, mannose, soy or inulin.

5 The probiotic bacteria may be lactobacilli or bifidobacteria, lactococcus, streptococcus, leuconostoc, pediococcus or enterococcus.

The carrier bodies may be in the form of pellets or capsules, or they may be in the form of strands running  
10 through the product or they may be in the form of layers. The carrier bodies are advantageously visible and identifiable to the consumer on eating the product and may conveniently be of any desired shape, e.g.  
15 cubes, spheres, rectangles, triangles, polygons, stars, leaves, shaped like DNA such as NERDS<sup>®</sup>, or irregular/random shapes. They may all be of approximately the same size or may be of varying, random sizes. The carrier bodies are preferably  
20 visually or texturally distinct from the surrounding confectionery product and easily identifiable to the consumer on eating the product. If desired, a flavour and/or a colour or reflective material may be incorporated in the carrier bodies, e.g. the flavour  
25 may be strawberry, raspberry, orange, mint etc, and may be coloured.

The carrier bodies could be made from a number of possible materials - selected to provide the desired  
30 visual, textural and flavour contrast to the confectionery product. Such materials could be jelly, pressed sugar, fudge, boiled sugar, biscuit, crystals of sugar, e.g. dextrose, or polyols with or without coating, starch-based, protein-based, e.g. gelatin, or  
35 any other edible item. One example of the carrier bodies comprises crystals of dextrose panned with

dextrose shaped like DNA. When the carrier body is a capsule, it may be composed of an edible outer shell (e.g. gelatin) with a liquid filling inside.

5 The carrier bodies may have a volume of, for instance, up to 0.1 to over 10,000 cubic millimetres, preferably from 0.125 to 8000 cubic millimetres, and more preferably from 1 to 1000 cubic millimetres.

10 The carrier bodies may contain from up to 0.00000001 to 100% by weight of active ingredient and preferably from 0.000001 to 50% by weight of active ingredient. Some active ingredients have high functional activity at very low doses such as vitamins and minerals  
15 (micronutrients), whereas others such as dextrose (macronutrients) are beneficial to the body in much higher amounts. Furthermore, plant extracts may only contain small amounts of active constituents within the bulk of the extract and may therefore need to be added  
20 in larger amounts to ensure sufficient effective quantities of the active parts.

The proportion of carrier bodies added to the confectionery product may be from 0.1% (or less) up to  
25 99%, and preferably from 5% to 50% by weight of finished product.

The number of carrier bodies in the confectionery product may depend on the requirements. For example,  
30 there may be just one carrier body but more usually there will be a plurality, e.g. up to 1,000.

The confectionery product may be of any shape, but conveniently in the shape of a bar.

When the basic confectionery material is chocolate, the chocolate product may be prepared by conventional methods or by cold extrusion described in EP 0603467B. The carrier bodies containing the active ingredients  
5 may be added at a critical point in the process to ensure the structure of the carrier bodies remains intact and the ingredients remain biochemically viable e.g. by adding to tempered liquid chocolate just before depositing into moulds.

10

#### EXAMPLE

The following Example further illustrates the present invention. Percentages are given by weight.

15

A milk chocolate bar is prepared containing orange flavoured and coloured pectin jelly pieces to which have been added vitamin C (ascorbic acid). The jelly pieces are hemispheres of approximately 5mm radius.

20

The finished 50g bar contains 15% of the RDA (recommended daily amount) of vitamin C. The product is prepared as follows:

25

The jelly pieces are prepared as follows:

30

1.	Low Methoxyl Pectin	19g
	Sugar, White	50g
	Sodium Citrate	3.1g
	Water, warm	400g

- Pre-mix the dry ingredients.
- Add slowly to the warm water and with continual stirring slowly bring it to the boil.

35

2.	Sugar, White	222g
	Glucose Syrup, 42DE	250g



- Add to part 1, return to the boil and cook to 80.0%SS.

3.	Flavour, Orange	1.5g
5	Colour, Orange	1.0g
	Citric Acid	7.0g
	Ascorbic Acid BP (Vitamin C)	0.57g
	(Note the quantity of ascorbic acid is based on providing 15% of the RDA for Vitamin C in the finished product - it does NOT allow for any losses during the manufacturing process or during storage)	
10		

Theor. Batch Yield 632g

- Add and stir in the ingredients of part 3.
- Deposit into starch impressions to form small hemispherical shaped pieces of approx. 5mm radius.
- When the jelly is set remove from starch.

## CHOCOLATE BAR

25	Milk chocolate	40g	80.0%
	Jelly pieces, above	<u>10g</u>	<u>20.0%</u>
		50g	100.0%

- Temper the chocolate and add the jelly pieces.
- Mix to give an even distribution of jelly pieces in the chocolate
- Deposit into bar mould and cool to set

35 The finished bar therefore provides 9mg of ascorbic acid which is equivalent to 15% of the European RDA for Vitamin C of 60mg (not allowing for any losses during processing or storage). The ascorbic acid is present in a plurality of orange coloured carrier bodies easily identifiable to the consumer.

## CLAIMS

1. A confectionery product comprising a basic confectionery component containing one or more active ingredients characterised in that the active ingredients are incorporated in a plurality of carrier bodies dispersed within the body of the confectionery product.
2. A confectionery product according to claim 1 wherein the basic confectionery component is chocolate, biscuit, wafer, nougat, praline, nuts, fruit, jelly, fondant cream, paste, caramel, chews or chewing gum.
3. A confectionery product according to claim 1 wherein the basic confectionery component contains one or more additional confectionery materials different to the basic confectionery component.
4. A confectionery product according to claim 1 wherein when the basic confectionery component contains additional confectionery materials, these confectionery materials are arranged in any number of dispositions.
5. A confectionery product according to claim 1 wherein the active ingredient is any vitamin, enzyme, amino-acid supplement, protein, gum, carbohydrate, phytochemical, dextrose, lecithin, other trace nutrient, brain-stimulating substance, energy provider, a mineral, mineral salt, botanical extract, antioxidant, prebiotic, probiotic bacteria, fatty acid, oat beta glucan or other functional fibre, creatine, carnitine, bicarbonate, citrate or any mixture thereof.
6. A confectionery product according to claim 5 wherein the mineral is calcium, iron, selenium, zinc,

magnesium, phosphorus, iodine, manganese, iron, boron, copper, molybdenum, potassium, chromium, vanadium or fluoride.

- 5 7. A confectionery product according to claim 5 wherein the phytochemical is a polyphenol, procyanidin, phenolic acid, catechin or epicatechin, isoflavone, terpene or other phytonutritive plant material.
- 10 8. A confectionery product according to claim 5 wherein the botanical extract is selected from Guarana, Ginkgo Biloba, Kola nut, Goldenseal, Golo Kola, Schizandra, Elderberry, St. John's Wort, Valerian and Ephedra, beta-sitosterol, caffeine, cafestol, D-limonene,
- 15 kabweol, nomilin, oltipraz, sulphoraphane, tangeretin, black tea, white tea, java tea, folic acid, garlic oil, fiber, green tea extract, lemon oil, mace, licorice, menthol, onion oil, orange oil, rosemary extract, milk thistle extract, Echinacea, Siberian ginseng or Panax
- 20 ginseng, lemon balm, Kava Kava, matte, bilberry, soy, grapefruit, seaweed, hawthorn, lime blossom, sage, clove, basil, curcumin, taurine, wild oat herb, dandelion, gentian, aloe vera, hops, cinnamon, peppermint, grape, chamomile, fennel, marshmallow,
- 25 ginger, slippery elm, cardamon, coriander, anise, thyme, rehmannia, eucalyptus, menthol, kava kava, schisandra, withania, cowslip, lycium, passion flower.
9. A confectionery produce according to claim 5 where
- 30 the antioxidant is glutathione peroxidase, superoxide dismutase, catalase, co-enzyme Q10 or honey.
10. A confectionery product according to claim 5 wherein the prebiotic contains fructose, galactose,
- 35 mannose, soy or inulin.

11. A confectionery product according to claim 5 wherein the probiotic bacteria is lactobacillus, bifidobacterium, lactococcus, streptococcus, leuconostoc, pediococcus, enterococcus.

12. A confectionery product according to claim 1 wherein the carrier bodies are in the form of pellets or capsules, or they are in the form of strands running through the product or they are in the form of layers.

13. A confectionery product according to claim 1 wherein the carrier bodies are visible and identifiable to the consumer on eating the product.

14. A confectionery product according to claim 1 wherein the carrier bodies are in the shape of cubes, spheres, rectangles, triangles, polygons, stars, leaves or irregular or random shapes.

15. A confectionery product according to claim 1 wherein the carrier bodies are all of approximately the same size.

16. A confectionery product according to claim 1 wherein the carrier bodies are of different sizes.

17. A confectionery product according to claim 1 wherein the carrier bodies are visually or texturally distinct from the surrounding confectionery product.

18. A confectionery product according to claim 1 wherein a flavour and/or a colour or reflective material is incorporated in the carrier bodies.

19. A confectionery product according to claim 1 wherein the carrier bodies are made from jelly, pressed

sugar, fudge, boiled sugar, biscuit or any other edible item.

5 20. A confectionery product according to claim 11 wherein when the carrier body is a capsule, it is composed of an edible outer shell with a liquid containing the active ingredient inside.

10 21. A confectionery product according to claim 11 wherein when the carrier body is a capsule, it is composed of an edible outer shell comprising gelatin.

15 22. A confectionery product according to claim 1 wherein the carrier bodies have a volume of from 0.125 to 8000 cubic millimetres.

20 23. A confectionery product according to claim 1 wherein the carrier bodies contain from 0.00000001 to 100% by weight of active ingredient.

24. A confectionery product according to claim 1 wherein the carrier bodies contain from 0.000001 to 50% by weight of active ingredient.

25 25. A confectionery product according to claim 1 wherein the proportion of carrier bodies added to the confectionery product is from 0.1% up to 99% by weight of finished product.

30 26. A confectionery product according to claim 1 wherein the number of carrier bodies in the confectionery product is from 1 to 10,000.

35 27. A confectionery product according to claim 1 wherein the confectionery product is in the shape of a bar.

28. A process of preparing a confectionery product according to claim 1 wherein the carrier bodies containing one or more active ingredients are added to  
5 the basic confectionery component in liquid form and solidifying the basic confectionery product containing the carrier bodies to ensure the structure of the carrier bodies remains intact and the ingredients remain biochemically viable.

10

29. A process according to claim 28 wherein the basic confectionery component is chocolate and the carrier bodies containing one or more active ingredients are added to the tempered chocolate in liquid form, and  
15 cooling to set the liquid tempered chocolate.

# INTERNATIONAL SEARCH REPORT

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<b>A. CLASSIFICATION OF SUBJECT MATTER</b> IPC 7 A23G3/00 A61K9/20 A23L1/00		
According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b> Minimum documentation searched (classification system followed by classification symbols) IPC 7 A23G A23L A61K		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practical, search terms used) WPI Data, PAJ, EPO-Internal		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 525 352 A (KONTOS ANGELOS ET AL) 11 June 1996 (1996-06-11) the whole document	1-29
X	EP 0 580 240 A (ATP AVANT GARDE TECHNOLOGIES &) 26 January 1994 (1994-01-26) the whole document	1-29
X	WO 92 11084 A (REDDING BRUCE K JR ; BUTCHER BRIAN (US); GARRISON WALTER S (US); SC) 9 July 1992 (1992-07-09) the whole document	1-29
<input type="checkbox"/> Further documents are listed in the continuation of box C. <input checked="" type="checkbox"/> Patent family members are listed in annex.		
* Special categories of cited documents : <div style="display: flex; justify-content: space-between;"> <div> <p>*A* document defining the general state of the art which is not considered to be of particular relevance</p> <p>*E* earlier document but published on or after the international filing date</p> <p>*L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>*O* document referring to an oral disclosure, use, exhibition or other means</p> <p>*P* document published prior to the international filing date but later than the priority date claimed</p> </div> <div> <p>*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>*X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>*Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>* &amp; * document member of the same patent family</p> </div> </div>		
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# INTERNATIONAL SEARCH REPORT

Information on patent family members

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Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5525352	A	11-06-1996	GR 1001437 B EP 0625042 A1 WO 9409758 A1 JP 7502763 T	30-12-1993 23-11-1994 11-05-1994 23-03-1995
EP 0580240	A	26-01-1994	IT 1255243 B EP 0580240 A1	20-10-1995 26-01-1994
WO 9211084	A	09-07-1992	AU 1241192 A CN 1066765 A MX 9102619 A1 WO 9211084 A1	22-07-1992 09-12-1992 01-06-1992 09-07-1992